Chapter 1

USFWS

Refuge trails meander along the creek

The Purpose of and Need for Action

Missisquoi National Wildlife Refuge
in the midst of a slow, languid stream
that the Abenaki people call
"Missisquoi" the "Land of the Flint"

Introduction

Missisquoi National Wildlife Refuge (Missiquoi Refuge, the refuge) lies on the eastern shore of Lake Champlain, near the Canadian border in Franklin County, Vermont (map 1–1). Established in 1943, the 6,592-acre refuge includes most of the Missisquoi River Delta, the largest wetland complex in the Lake Champlain Basin. As it flows through the refuge, the Missisquoi River passes through the largest and perhaps highest quality silver maple floodplain forest in the State. The river meanders through extensive natural and managed marshes of wild rice, buttonbush, and tussock sedge that host thousands of waterfowl during migration. The part of the river in the refuge harbors rare freshwater mussels, turtles, and fish. Its delta is a critical link for migratory birds along the Atlantic Flyway. Refuge lands protect the Shad Island great blue heron rookery, the largest in Vermont. Other important refuge habitats include pitch pine woodland bog, alder thickets and other shrub lands, patches of oak and northern hardwood forest, and grasslands.

The refuge sits at the mouth of the 767,000-acre Missisquoi River watershed (refer to map 1–1). The 88-mile river flows through forested and agricultural uplands and many towns in Vermont and Quebec. Broad-based watershed-wide planning is underway to address water quality concerns, including excessive phosphorus, bacteria, mercury, pesticides, and other pollutants and the loss of fish and wildlife habitat. The refuge staff is engaged in that planning. The river flows through the refuge and into Lake Champlain at Missisquoi Bay. About the size of the State of Massachusetts, Lake Champlain drainage basin comprises five distinct segments. The Missisquoi Bay segment, which lies mostly in Canada, is quite shallow and relatively warm. A host of local, regional, and international groups focuses on the lake and its management issues.

The management issues in the Missisquoi River watershed and the Lake Champlain Basin also affect the fish, wildlife, and habitats of the Missisquoi Refuge; any refuge planning and management decisions must address them. Our planning process enables the refuge to identify its management priorities for lands under its jurisdiction and identify its role in helping to conserve the lands and waters in the larger landscape.

USFWS

Missisquoi River

Purpose and Need for Action

A Comprehensive Conservation Plan's (CCP) *purpose* is to provide strategic management direction on a refuge for the next 15 years by:

- providing a clear statement of desired future conditions for habitat, wildlife, visitor services, staffing, and facilities
- providing State agencies, refuge neighbors, visitors, and partners with a clear explanation of the reasons for management actions

- ensuring refuge management reflects the policies and goals of the Refuge System and legal mandates
- ensuring the compatibility of present and future public use
- providing long-term continuity and direction for refuge management
- providing direction for staffing, operations, maintenance, and annual budget requests

The present needs for this CCP are many. First, Missisquoi Refuge lacks a master plan to fulfill its obligations, especially as environmental, economic, and social conditions have changed dramatically since the refuge was first established. Development and land protection near the refuge have both increased in the last few decades; the refuge completed a new Headquarters and Visitor Contact Station in 2005, providing new opportunities for education and outreach; and the refuge staff is working with many new partners on water quality and land use issues in the Lake Champlain Basin. Given the changing face of the region, we feel our responsibility is to develop our priorities clearly. This CCP is also a valuable tool to help the State of Vermont natural resource agencies, Lake Champlain Basin and Missisquoi River watershed partners, other conservation organizations, local communities and the public understand and support refuge priorities.

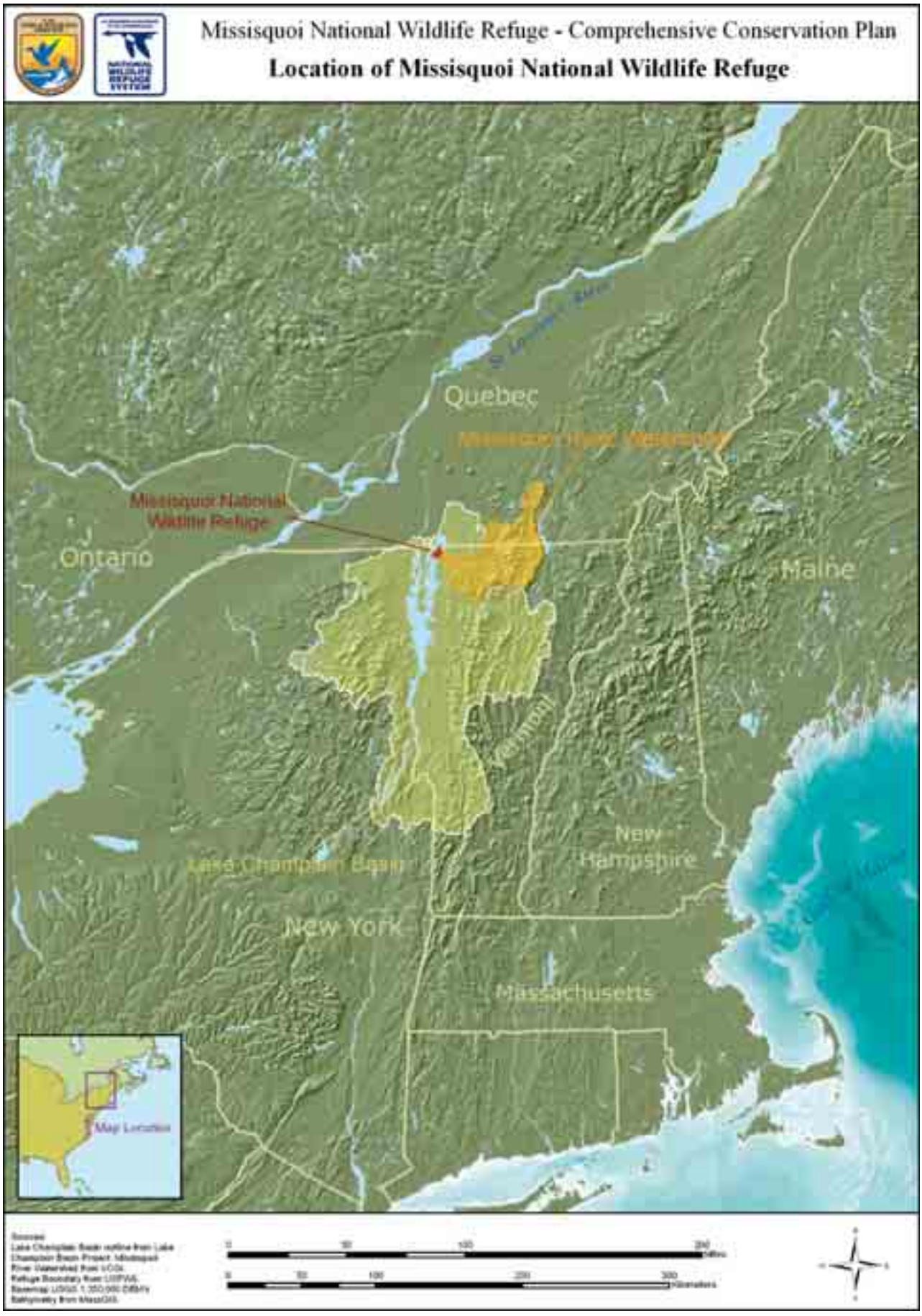
Second, the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act; Public Law 105–57; 111 Stat. 1282) requires that all national wildlife refuges have CCPs in place by 2012 to help fulfill the mission of the Refuge System. This draft CCP/EA combines two documents required by federal laws: a CCP, required by the Improvement Act; and an Environmental Assessment (EA), required by the National Environmental Policy Act (NEPA) of 1969.

Finally, the CCP is needed to address issues identified through the planning process, by the public, partners, other agencies and refuge staff, as adversely affecting the populations and habitats of fish, wildlife, and plants within the refuge. These issues are described in detail on pages 19-22.

Proposed Action

This draft CCP/EA evaluates and compares two alternatives and their effects on key biological, physical, social, and cultural resources. We have selected alternative B as our proposed action, the U.S. Fish and Wildlife Service (Service, USFWS, we, our) preferred alternative, because the CCP planning team believes it best achieves the refuge purposes, vision, and goals; contributes to the Refuge System mission; addresses the issues and relevant mandates; and is consistent with the principles of fish and wildlife management science. It will result in a better understanding of the refuge resources used by threatened or endangered species, migratory birds, and resident wildlife; the protection and enhancement of those resources; the protection of water quality; the restoration of refuge habitats; and the accessibility of the refuge to the public for compatible, wildlife-dependent public uses.

The identification of our preferred alternative is preliminary. The comments we receive on this draft CCP/EA will in part determine the alternative ultimately selected for implementation in the final CCP. The final CCP may modify the proposed action presented in this draft CCP/EA. Our regional director in Hadley, Massachusetts, is the official responsible for approving the final CCP/EA.


Missisquoi National Wildlife Refuge - Comprehensive Conservation Plan
Location of Missisquoi National Wildlife Refuge
Quebec
Missisquoi National Wildlife Refuge
Ontario
Maine
New Hampshire
Lake Champlain Basin
New York
Massachusetts
Map Location

Policies, Legal Mandates, and Other Plans Guiding the Planning Process

This section presents hierarchically, from the national to the local level, highlights of Service policy, legal mandates and regulations, and existing resource plans and conservation initiatives that directly influenced the development of this draft CCP/EA.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service, part of the Department of the Interior, administers the National Wildlife Refuge System (Refuge System). The mission of the Service is:

> "*Working with others, to conserve, protect and enhance fish and wildlife and plants and their habitats for the continuing benefit of the American people.*"

By law, Congress entrusts national resources to the Service for conservation and protection. Those trust resources include the lands included in national wildlife refuges, migratory birds, federal-listed endangered and threatened species, inter-jurisdictional fishes, wetlands, and certain marine mammals. The Service also manages national fish hatcheries, enforces federal wildlife laws and international treaties on importing and exporting wildlife, assists state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

The Service manual contains the standing and continuing directives for implementing those authorities, responsibilities, and activities. The manual can be accessed at *http://www.fws.gov.directives/direct.html*.

Special Service directives that affect the rights of citizens or the authorities of other agencies are published separately in the Code of Federal Regulations, and are not duplicated in the Service manual. Most of the current regulations that pertain to the Service are issued in 50 CFR parts 1-99. The CFR can be accessed at *http://www.access.gpo.gov/nara/cfr/index.html.*

The National Wildlife Refuge System

The Refuge System is the world's largest network of public lands and waters set aside specifically for conserving wildlife and protecting ecosystems. From its inception in 1903, it has grown to more than 96 million acres of public lands, 545 national wildlife refuges in all 50 states, and waterfowl production areas in 10 states. More than 34 million visitors each year hunt, fish, observe and photograph wildlife, or participate in environmental education and interpretation on those refuges.

> **Refuge System Mission and Goals**
> *"The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."*
> *— National Wildlife Refuge System Improvement Act of 1997*

The fundamental mission of the Refuge System is wildlife conservation. The goals of the Refuge System are to:

- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered
- Perpetuate migratory bird, inter-jurisdictional fish, and marine mammal populations

- Conserve a diversity of fish, wildlife, and plants
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems
- Foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public uses including hunting, fishing, wildlife observation and photography, and environmental education and interpretation

Fulfilling the Promise

A yearlong process involving teams of Service employees who examined the Refuge System within the framework of Wildlife and Habitat, People and Leadership culminated with "Fulfilling the Promise: The National Wildlife Refuge System" (USFWS 1999), a vision for the National Wildlife Refuge System. The first-ever Refuge System Conference in Keystone, Colorado in October 1998, was attended by every refuge manager in the country, other Service employees, and scores of conservation organizations. Many "Promises Teams" formed to develop strategies for implementing the 42 recommendations of the conference report. Information from such teams as Wildlife and Habitat, Goals and Objectives, Strategic Growth of the Refuge System, Invasive Species, and Inventory and Monitoring helped guide the development of the goals, strategies and actions in this draft CCP/EA.

Refuge Planning and Management Guidance

The Improvement Act directs the Service to monitor the status and trends of fish, wildlife, and plants on each refuge and maintain the biological integrity, diversity, and environmental health of each refuge and the System (601 FW 3).

The Service refuge planning policy (602 FW 3) also guides the development of a CCP. The planning process calls for development of a vision statement, goals, objectives, and strategies. Goals and objectives are the unifying elements of successful refuge management. They identify and focus management priorities, provide a context for resolving issues, guide specific projects, provide rationale for decisions, and provide the connection between management actions and the refuge purpose, System mission, and other policies.

The vision broadly reflects what the refuge should be or what the Service hopes to do, based primarily upon the System mission, refuge purposes, and other mandates. Because the vision may take several decades to achieve, it typically will remain in place 15 years or more. Goals narrow the vision into general, supporting management directions. Under each goal, objectives direct management into incremental and measurable steps toward achieving the goal. Strategies are the specific tools or actions to accomplish the objectives. Strategies tend to be flexible, and may change frequently. Objectives also may change, but only if it becomes clear over time, through monitoring and evaluation, that the objectives would not further the goals they support. Often, more specific strategies and schedules in step-down management plans will be necessary to implement some of them.

The Improvement Act also directs the Secretary of the Interior to facilitate six compatible, wildlife-dependent recreational activities as priority general uses of the Refuge System. Those are hunting, fishing, wildlife observation and photography, and environmental education and interpretation. For a use to be compatible, it must not materially interfere with the purposes of a refuge or detract from the mission of the Refuge System. Each refuge manager determines which public uses are compatible, based on sound professional judgment. That is,

a decision that is consistent with the principles of fish and wildlife management and administration, available science and resources, and adherence with law. Compatibility determinations must be in writing, must identify the anticipated effects of the proposed use on refuge resources, and include stipulations to mitigate those effects. See appendix B for compatibility determinations for the Missisquoi Refuge.

Maintaining Biological Integrity, Diversity, and Environmental Health Policy

This policy provides guidance on maintaining or restoring the biological integrity, diversity, and environmental health of the Refuge System including the protection of a broad spectrum of fish, wildlife, and habitat resources found in refuge ecosystems. It provides refuge managers with a process for evaluating the best management direction to prevent the additional degradation of environmental conditions and to res tore lost or severely degraded environmental components. It also provides guidelines for dealing with external threats to the biological integrity, diversity, and environmental health of a refuge and its ecosystem (601 FW 3). See appendix J for more details on the Integrity Policy, how we used it to determine priority resources of concern, and how that lead to the development of habitat goals and objectives at the Missiquoi refuge.

Appropriate Refuge Uses Policy

This policy provides a national framework and procedure for refuge managers to follow when deciding if uses are appropriate on a refuge. It also clarifies and expands on the compatibility policy (603 FW 2.10D), which describes when refuge managers should deny a proposed use without determining compatibility. When we find a use is appropriate, we must then determine if the use is compatible before we allow it on a refuge. This policy applies to all proposed and existing uses in the Refuge System only when we have jurisdiction over the use and does not apply to refuge management activities or situations where reserved rights or legal mandates provide we must allow certain uses (603 FW 1). Appendix B further describes the Appropriate Refuge Uses Policy and describes its relationship to the CCP process.

Compatibility Policy

Federal law and Service policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities and ensure that Americans can enjoy Refuge System lands and waters. The Refuge Improvement Act is the key legislation regarding management of public uses and compatibility. The compatibility requirements of the Refuge Improvement Act were adopted in the USFWS Final Compatibility Regulations and Final Compatibility Policy, published October 18, 2000 (Federal Register, Vol. 65, No. 202, pp. 62458-62496). This Compatibility Rule changed or modified Service regulations contained in chapter 50, parts 25, 26, and 29 of the Code of Federal Regulations (USFWS 2000). The compatibility determinations for Missisquoi refuge can be found in appendix B along with additional information on the process. To view the policy and regulations online, visit *http://policy.fws.gov/library/00fr62483.pdf.*

Wildlife-Dependent Recreation Policy

The Improvement Act defines and establishes that compatible wildlife dependent recreational uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) are the priority general public uses of the Refuge System and will receive enhanced and priority consideration in refuge planning and management over other general public uses. The Wildlife Dependent Recreation Policy explains how we will provide visitors with opportunities for those priority public uses on units of the Refuge System and how we will facilitate these uses. We are incorporating this policy as Part 605, chapters 1–7, of the Fish and Wildlife Service Manual.

Other Legal Mandates

Although Service and Refuge System policy and each refuge purpose provide the foundation for management, the way we administer national wildlife refuges must also comply with a variety of other Federal laws, executive orders, treaties, interstate compacts, and regulations pertaining to the conservation and

protection of natural and cultural resources. Our "Digest of Federal Resource Laws of Interest to the Service," which lists them, can be accessed at *http://laws.fws.gov/lawsdigest/indx.html.*

Chapter 4, "Environmental Consequences," specifically evaluates our compliance with the Clean Water Act, Clean Air Act, the National Historic Preservation Act, the Archeological Resources Protection Act, and the Endangered Species Act (ESA). We wrote this draft CCP/EA to fulfill compliance with NEPA.

National and Regional Plans and Conservation Initiatives

To the extent possible, a refuge CCP assists in meeting the conservation goals established in existing national and regional plans, state fish and wildlife conservation plans, and other landscape-scale plans covering the same watershed or ecosystem. We consulted the following plans in developing this draft CCP/EA.

North American Bird Conservation Initiative (NABCI)

The NABCI brings together the individual land bird (Partners in Flight), shorebird, waterbird, and waterfowl plans described below into a coordinated effort to protect and restore all native bird populations and their habitats in North America. All bird conservation partnerships reduce redundancy in the structure, planning and implementation of conservation projects. It uses Bird Conservation Regions (BCRs) to guide landscape-scale, science-based approaches to conserving birds and their habitats. This CCP uses the priorities in the BCR 13 preliminary plan as well as guidance from the individual bird plans. Visit *http://www.nabci-us.org/* for more information on the NABCI.

Missisquoi Refuge lies in BCR 13, Lower Great Lakes/St. Lawrence Plain (map 1–2). BCR 13 encompasses the vast, low-lying lake plain region surrounding Lakes Erie and Ontario, the St. Lawrence River valley, low-lying regions between the Adirondack Mountains and the Laurentian Highlands, and upper regions of the Hudson River valley. In addition to important lakeshore habitats and associated wetlands, this region originally was covered with a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Although once dominated by forests, the landscape now is dominated by agriculture interspersed with wetlands and remnant forest stands. Today, nearly 95 percent of the original habitat types have been lost to agriculture and urban development. BCR 13 plays a critical role in providing important staging and migrating habitat for birds in the spring and fall (Hartley et al. Draft 2006). The BCR 13 draft plan is now being reviewed and a final draft will be posted when complete on the ACJV publications page at the following link: *http://www.acjv.org/resources.htm*

North American Waterfowl Management Plan: Atlantic Coast Joint Venture

The North American Waterfowl Management Plan (NAWMP), signed by the United States and Canada in 1986 and by Mexico in 1994, provides a strategy to protect North America's remaining wetlands and conserve waterfowl populations through habitat protection, restoration, and enhancement (USFWS and CWS 1986). The plan was updated in 1998 and again in 2004 to emphasize strengthening its biological foundation, using a landscape planning approach, and expanding partnerships (USFWS and CWS 2004). Its implementation is accomplished at the regional level, in 11 Joint Venture Habitat Areas in the United States and four in Canada: one stretches across the United States—Canada border. Partnerships involve federal, state and local governments, tribal nations, local businesses, conservation organizations, and individual citizens for protecting habitat. By 2004, NAWMP partners had invested more than $3.2 billion to protect, restore, or enhance more than 13.1 million acres of habitat. More information on the NAWMP is available at *http://www.fws.gov/birdhabitat/nawmp/nawmphp.htm.*

The Missisquoi Refuge lies in the Atlantic Coast Joint Venture (ACJV), one of the original joint ventures formed under the NAWMP and initially focused on protecting and restoring habitat for the American black duck and other

waterfowl species in the Atlantic Coast region of the United States. Much of its support is generated through grants provided by the North American Wetlands Conservation Act. While maintaining that strong focus on waterfowl, the ACJV mission has evolved to include the conservation of habitats for all birds. The ACJV is working on integrated planning efforts in eight BCRs. Focus areas, which are specific, important geographic areas with joint venture regions, were identified and mapped for waterfowl and are being developed for other migratory birds within each BCR. Those focus areas are discrete, distinguishable habitats or habitat complexes that are regionally important for one or more priority waterfowl species during one or more life history stages. Missisquoi Refuge is a sub-focus area within the extensive Lake Champlain Focus Area of Vermont and New York, highlighting the refuge's importance for waterfowl. Visit *http://www.acjv.org* for more information.

North American Waterbird Conservation Plan

The waterbird plan is an independent partnership among individuals and institutions with interest and responsibility for conserving waterbirds and their habitats. The primary goal of the plan is to ensure that the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding waterbirds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean. The plan provides a framework for conserving and managing colonially nesting water-dependent birds and promotes continent-wide planning and monitoring, national-state-provincial conservation action, regional coordination, and local habitat protection and management (Kushlan et al. 2002). Regional planning information is being prepared for the Mid-Atlantic New England Working Group (MANEM).

We used the plan in the development of objectives, actions and strategies for protecting and managing waterbirds that breed on the refuge including black tern, American bittern, and great blue heron. The waterbird plan is available at *http://www.nawcp.org*. For additional information, visit *http://www.fws.gov/birds/waterbirds/manem/*

U.S. Shorebird Conservation Plan and Northern Atlantic Regional Shorebird Plan

The shorebird plan is a partnership across the United States to ensure that stable, self-sustaining populations of all shorebird species are restored and protected. Collaborators include local, state, and federal agencies, non-governmental organizations, business-related sectors, researchers, educators, and policy makers. The plan was closely coordinated with NAWMP and Joint Venture staff, as well as the Partners In Flight and North American Waterbird Plan teams as they concurrently developed their revised national plans. Those experts helped set conservation goals for each region of the country, identified critical habitat and research needs, and proposed education and outreach programs to increase awareness of shorebirds and the threats they face.

The U.S. Shorebird Plan (Brown et al. 2001) identifies three primary objectives:

- Develop a standardized, scientifically sound system for monitoring and studying shorebird populations that will provide practical information to researchers and land managers for shorebird habitat conservation
- Identify the principles and practices upon which local, regional and national management plans can effectively integrate shorebird habitat conservation with multiple species strategies
- Design an integrated strategy for increasing public awareness and information concerning wetlands and shorebirds

Regional plans, including the North Atlantic Regional Shorebird Plan, are being developed as part of the overall strategy (Clark and Niles 2000). We used the national and regional shorebird plans in developing the regional resources

of concern list (appendix C) and in considering the value of the refuge for migrating shorebirds, particularly during years of low water levels on Lake Champlain. The national plan can be accessed at *http://shorebirdplan.fws.gov/USShorebird.htm*, and the regional plan at *http://www.fws.gov/shorebirdplan/regionalshorebird/regionalplans.htm*.

Partners In Flight (PIF) Landbird Conservation Plans

In 1990, PIF was conceived as a voluntary, international coalition of government agencies, conservation organizations, academic institutions, private industry, and other citizens dedicated to reversing the population declines of bird species and "keeping common birds common." The foundation of PIF's long-term strategy for bird conservation is a series of scientifically and geographically based bird conservation plans. The initial focus on Neotropical migrating birds has since expanded to include all land birds. You can view the PIF Landbird Conservation Plan at: *http://www.partnersinflight.org/cont_plan/default.htm*

Initially, PIF developed draft conservation plans within "physiographic areas"; Missisquoi Refuge lies in PIF Area 18 – the St. Lawrence Plain (Rosenberg 2000). PIF developed a set of science-based rules to evaluate the conservation status of all bird species, using a species' population size, distribution, population trend, threats, and regional abundance objectively to identify regional and continental conservation priorities. Those rules were adapted, and are now being used at the BCR level to identify bird conservation priorities and opportunities (refer to map 1-2). In developing our habitat goals and objectives, we referred to its draft plan, now online at *http://www.blm.gov/wildlife/plan/pl_28_10.pdf.*

Lake Champlain Basin

"Opportunities for Action: An Evolving Plan for the Lake Champlain Basin," a pollution prevention, control, and restoration plan, was first endorsed in October 1996 by the governors of New York and Vermont, the Province of Quebec, and the regional administrators of the U.S. Environmental Protection Agency (EPA). Updated in 2003 (Lake Champlain Steering Committee 2003), the plan is available online at *http://www.lcbp.org/viewofa.htm*.

The plan identifies several critical environmental problems and issues in the Lake Champlain Basin that require action:

- High phosphorus levels and algal blooms in parts of the Lake, including Missisquoi Bay
- Toxic substances, such as polychlorinated biphenyls (PCB's) and mercury, resulting in fish consumption advisories
- Impacts to fish and wildlife from nuisance non-native aquatic species
- Wetland loss
- Habitat fragmentation
- Public access issues
- Recreational use conflicts
- Loss of cultural and archeological resources

Implementing the recommendations in the plan requires partnerships and a watershed and ecosystem approach. Many of those environmental issues affect the Missisquoi Refuge, which is an important partner in helping to implement the plan.

Lake Champlain Ecosystem Team

The USFWS Lake Champlain Ecosystem Team works to protect enhance and conserve fish and wildlife resources in the Lake Champlain watershed for public benefit by managing Service lands, supporting fish and wildlife restoration, providing technical expertise in fish and wildlife conservation and management, enhancing interagency cooperation and partnerships, and better informing the public about fish and wildlife resource issues. The team, a group of conservation and research professionals from various organizations working in the Lake Champlain Basin, attempts to approach conservation issues with an appreciation of the entire ecosystem and address conservation needs considering sustainability and landscape-level aspects of the ecosystem (see *http://www.fws.gov/r5lcfwro/*). The refuge, as a member of that team, exchanges its expertise with that of other members, and receives guidance on issues important in refuge management.

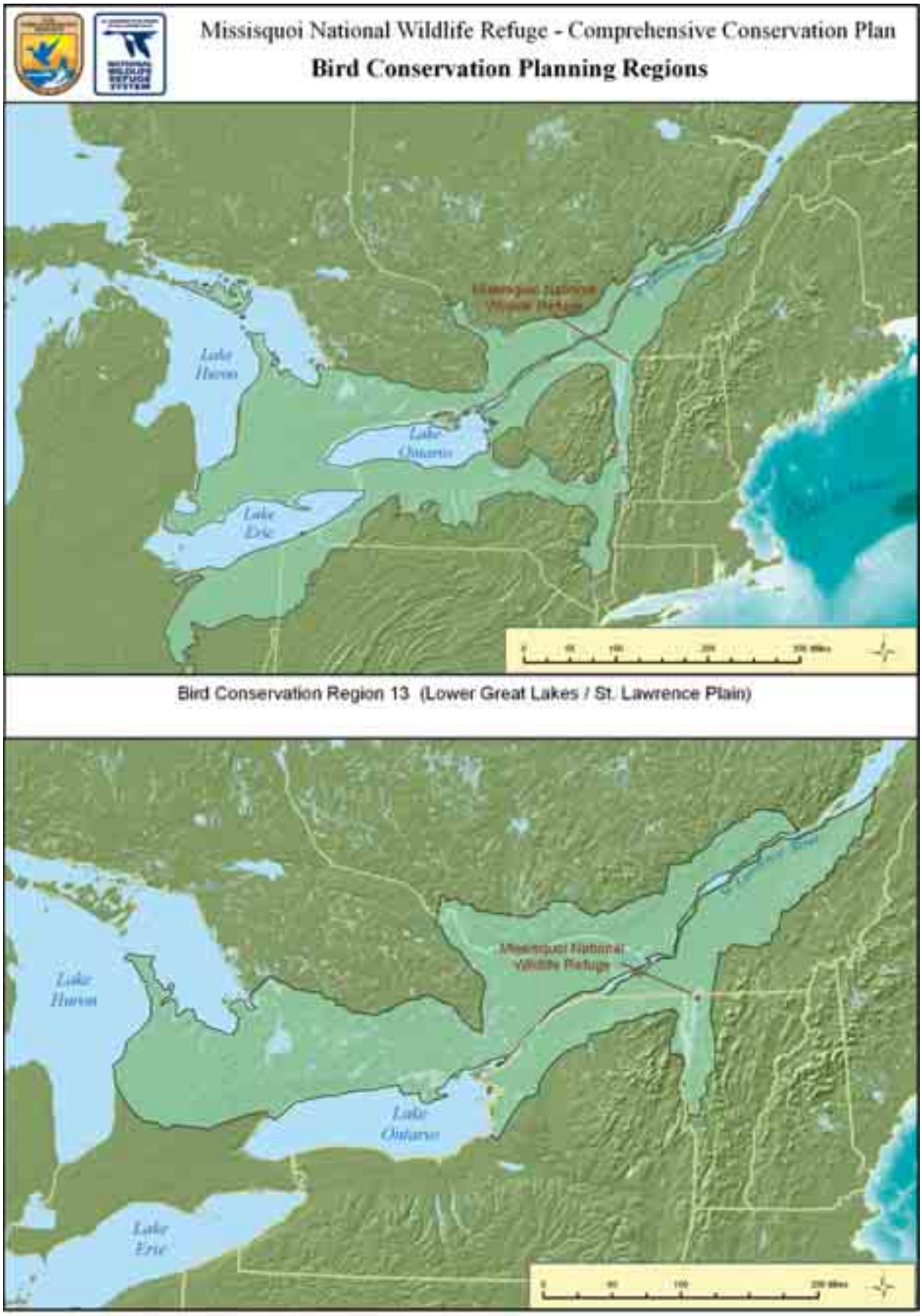
The Governor's Clean and Clear Action Plan

Vermont's Governor Jim Douglas is promoting this plan, initiated in the fall of 2003, to improve the water quality of Lake Champlain. It focuses on reducing phosphorous loading, stopping non-point source pollution, developing comprehensive river management programs, managing storm water runoff, and controlling erosion at construction sites. It supports the Agricultural Best Management Practices Program, Conservation Reserve Enhancement Program, Better Back Roads Program, Wetland Restoration Program, the advancement of Watershed Planning and the involvement of citizens in the Vermont Lay Mentoring Program. The Vermont legislature supports the plan, and provides funds annually to tackle those initiatives. For more information, visit *http://www.anr.state.vt.us/cleanandclear/index.htm*.

Missisquoi Bay Watershed Planning

Buttressed now by the development of the Governor's Clean and Clear Action Plan, local citizen groups, landowners, towns, and public agencies have worked for many years to reduce pollution in the Missisquoi River and its watershed. Actions include stabilizing stream banks, improving municipal wastewater treatment, and adopting better road maintenance and farming practices. The State of Vermont is building on those efforts by facilitating a collaborative planning process for the watershed. It brings together homeowners, farmers, local officials, business people, and other concerned citizens to determine how best to protect and restore water quality in the Missisquoi Bay and its watershed. The watershed planning process formally began with a series of public forums early in 2005. They invited citizens to voice their concerns about water quality and their ideas for addressing them. The top concerns were:

- Impacts of excessive phosphorus and the resulting algal blooms in Missisquoi Bay and Lake Carmi
- Soil erosion from stream banks, cropland, construction, and roads
- Phosphorus in runoff from developed and agricultural land
- Phosphorus and bacteria from wastewater sources, including failing shoreline septic systems
- Lack of water quality monitoring to identify source areas and track progress in pollution control
- Lack of funding, coordination, and prioritization for water quality improvement activities
- General lack of public awareness of how everyone's actions affect water quality
- The presence and effects of pollutants other than phosphorus (e.g., mercury and pesticides)


Missisquoi National Wildlife Refuge - Comprehensive Conservation Plan
Bird Conservation Planning Regions
Lake Huron
Lake Ontario
Lake Erie
Missisquoi National Wildlife Refuge
Bird Conservation Region 13 (Lower Great Lakes / St. Lawrence Plain)
Lake Huron
Lake Ontario
Lake Erie
Missisquoi National Wildlife Refuge
Partners in Flight Physiographic Area 18 (St. Lawrence Plain)

- Loss of the working landscape (farm and forest) and sensitive animal habitat to development
- Impacts of the bridge causeway (and other causeways) on water quality in Missisquoi Bay
- Declines in fishing and suitable fish habitat

A watershed council consisting of a diverse mix of stakeholders from within the watershed is meeting to address those and other issues. The council will develop a series of action strategies for protecting high-quality waters in the watershed and restoring those that are not meeting State standards. For more information and to read summaries of each forum, visit *http://www.anr.state.vt.us/dec/waterq/planning/htm/pl_missisquoi.htm*.

Invasive Species Management Partnership

The Missisquoi Refuge staff is collaborating with several Federal, State, municipal, and nongovernmental partners to develop a network of interested members who will provide informational and educational materials and conduct strategic projects designed to curtail the advance of exotic invasive plant species in the Lake Champlain watershed. The Nature Conservancy (TNC) proposed the partnership, modeled after other successful weed management units established in the country. The partners first met in December 2005 to develop a vision and mission statement describing what the partnership is trying to achieve. The mechanism of how the group will interact with the public, units of government, landowners and others, and fund projects and materials, is still being developed. The current partnership includes representatives primarily from the Vermont side of Lake Champlain. It includes the U.S. Forest Service, Natural Resource Conservation Service (NRCS), TNC, the Vermont Fish and Wildlife Department (VT FWD), Department of Forests and Parks, Winooski Park District, Agency of Transportation, U.S. Fish and Wildlife Service, Lewis Creek Association, and private plant nursery businesses. The makeup of the group likely will change and grow as the group focuses its efforts and develops objectives for the watershed.

Vermont State Wildlife Action Plan

In 2001, Congress established a new annual appropriation to State wildlife agencies, first called the Wildlife Conservation and Restoration Program, and later, the State Wildlife Grants Program. Each state was eligible for those funds based on a commitment to develop a "comprehensive wildlife conservation strategy," by October 1, 2005. The State Wildlife Action Plan (WAP) addresses the full array of wildlife, although the focus is on "species of greatest conservation need." The WAP for Vermont is not solely a Fish and Wildlife Department plan, but also a "blueprint for wildlife conservation in Vermont," promoting broad involvement in implementing conservation strategies. The Missisquoi Refuge is a partner with the State in helping to develop and implement the plan. Specifically for the CCP process, because Vermont just submitted its WAP to the Service for approval, we used the list of "species of greatest conservation need" in developing refuge habitat management goals and objectives and where possible are contributing to Vermont wildlife conservation priorities (see chapter 2 and appendix C).

Refuge Purposes and Land Acquisition History

The Refuge Headquarters and Visitor Contact Station is located in Swanton, Vermont. The Missisquoi Refuge was established in 1943 "...for use as an inviolate sanctuary, or any other management purposes, for migratory birds" under the Migratory Bird Conservation Act. It encompasses 6,592 acres in the Towns of Highgate and Swanton in Franklin County, Vermont (refer to map 1–3). We acquired a succession of lands after 1943 under the provisions of the Migratory Bird Conservation Act, Migratory Bird Hunting and Stamp Act, and other authorities.

The refuge also owns in fee a 262-acre parcel known as the Westville Unit in Westville, New York (map 3–2). In addition, the refuge holds several conservation

easements, including the Rock River easement (map 3–3), which we obtained through the Farmers Home Administration debt-restructuring program for farmers.

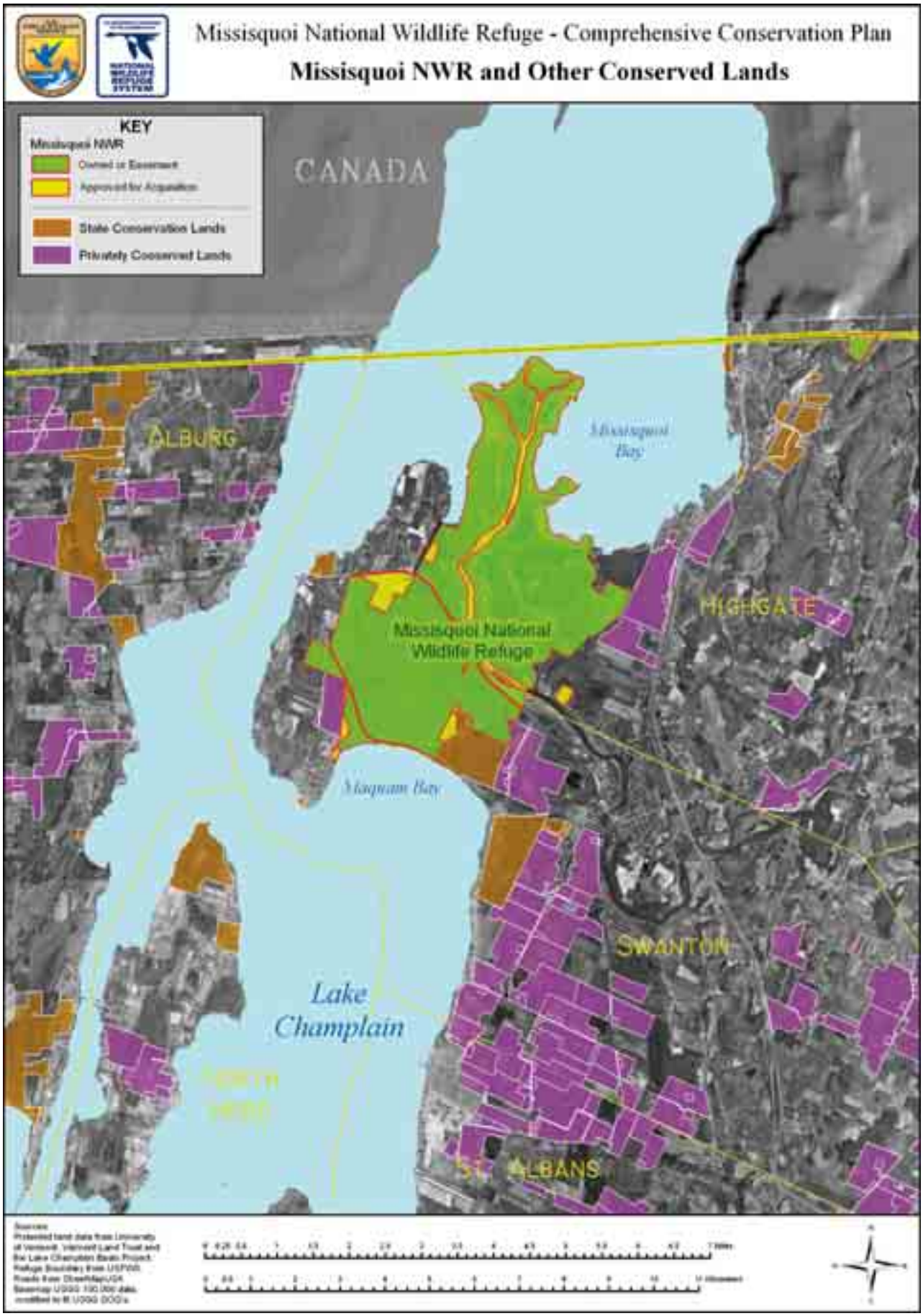
Historically, our land acquisition funds come from two sources: the Land and Water Conservation Fund, appropriated annually by Congress, and the Migratory Bird Conservation Fund, replenished primarily through the sale of Federal duck stamps to migratory waterfowl hunters and other conservationists. The Service purchases important mainland habitats and nationally significant wetlands within approved acquisition boundaries from willing sellers at fair market value as funds become available. Annual expenditures for refuge land acquisition recently have averaged $36,300/year.

Table 1.1. History of Acquisition at Missisquoi Refuge.

Tract Number	Tract Name	Acquired Date	Acquired Acres**	Acquisition Authority
5	Clark, Julian B., et al.	02/04/1943	114.39	Migratory Bird Conservation Act
5a	Clark, Julian B., et al.	02/04/1943	1,467.76	Migratory Bird Conservation Act
5b	Clark, Julian B., et al.	04/27/1949	135.13	Migratory Bird Conservation Act
5c	Clark, Julian B., et al.	12/27/1961	453.92	Migratory Bird Conservation Act
9	Duval, George E.	03/10/1948	105.51	Migratory Bird Conservation Act
13	Cheney, Ila F.	07/24/1948	118.19	Migratory Bird Conservation Act
10	Tabor, Cora M.	08/25/1955	692.40	Migratory Bird Conservation Act
10a	Tabor, Cora M.	08/25/1955	184.70	Migratory Bird Conservation Act
10b	Tabor, Cora M.	08/25/1955	104.30	Migratory Bird Conservation Act
10b-I	Tabor, Cora M.	08/25/1955	0.07	Migratory Bird Conservation Act
4	Robert, Patrick, et al.	09/15/1955	141.10	Migratory Bird Conservation Act
15	Casey, Arthur T.	08/01/1956	79.50	Migratory Bird Conservation Act
15b	Casey, Arthur T.	08/01/1956	248.75	Migratory Bird Conservation Act
23	Boomhower, Albridge	01/08/1958	11.30	Migratory Bird Conservation Act
21	Donaldson, Glenna, et al.	01/21/1960	121.65	Migratory Bird Conservation Act
16	Carman, John A.	06/26/1961	40.51	Other
16a	Carman, John A.	06/26/1961	29.21	Other
16a-I	Carman, John A.	06/26/1961	32.12	Other
25	Bushey, Royal C.	06/26/1961	77.85	Migratory Bird Conservation Act
22	Brown, Donald W.	05/07/1963	443.02	Migratory Bird Conservation Act
22a	Brown, Donald W.	05/07/1963	78.60	Migratory Bird Hunting and Stamp Act
12	Prouty, Charles D.	09/28/1971	98.80	Migratory Bird Conservation Act
12-I	Prouty, Charles D.	09/28/1971	15.20	Migratory Bird Conservation Act
14	The Nature Conservancy	05/28/1976	655.00	Migratory Bird Conservation Act
14a	The Nature Conservancy	05/28/1976	202.00	Migratory Bird Conservation Act
19	Comolli, Edward J., et al.	05/17/1984	188.00	Migratory Bird Conservation Act
14b	The Nature Conservancy	04/12/1994	235.00	Migratory Bird Conservation Act
14c	The Nature Conservancy	04/13/1994	264.50	Other
26	Frazier Estate, Irene	11/20/1996	8.00	Migratory Bird Conservation Act
14d	The Nature Conservancy	03/30/1998	82.00	Migratory Bird Conservation Act
14e	The Nature Conservancy	04/12/2000	93.00	Migratory Bird Conservation Act
28a	Trust For Public Land	03/01/2004	39.00	Migratory Bird Conservation Act
36	David Cross	04/04/2006	10.1	Migratory Bird Conservation Act
TOTAL			6,570.58*	

* *This number is our official acreage total from the Division of Realty. For Tract #21 (originally 153.42 acres), we disposed of 31.77 acres in exchange for tracts 16a and 16a-1.*

***All acreages round to the nearest whole number, and represent U.S. Geological Survey (USGS) land acres above the mean high water mark.*


Missisquoi National Wildlife Refuge - Comprehensive Conservation Plan
Missisquoi NWR and Other Conserved Lands
KEY
Missisquoi NWR
Owned or Easement
Approved for Acquisition
State Conservation Lands
Privately Conserved Lands
CANADA
ALBURG
Missisquoi Bay
Missisquoi National Wildlife Refuge
HIGHGATE
Maquam Bay
SWANTON
Lake Champlain
ST. ALBANS

Missisquoi Refuge Vision Statement

"The Missisquoi River delta is known as an important international resource for the people of the United States and Canada. The Missisquoi Refuge is recognized for its role in maintaining the ecological integrity of the river delta, providing breeding, staging, and migration habitat for thousands of waterfowl and other fish and wildlife. Education, research, and wildlife-dependent recreational opportunities are available, insofar as they are compatible with Refuge health and protection. Refuge staff partner with local, state, and federal agencies, local organizations and communities, and individuals to sustain a healthy Lake Champlain ecosystem for current and future generations."

"The future of the Missisquoi Refuge and the sustained integrity of the river delta ecosystem relies on continued understanding of the past and present biological processes and human influences that created and maintain this large wetland complex. The cultural resources at the Refuge provide valuable insight into the history and way of life of native peoples. The Refuge is a welcoming destination for our neighbors and other visitors seeking to enjoy and learn about the history and wildlife of the Missisquoi River delta and the National Wildlife Refuge System."

Tom Ramsay/USFWS

Mallard and Brood

Step-Down Management Plans

The Service Manual (602 FW 4, "Refuge Planning Policy") lists more than 25 step-down management plans that may be appropriate to ensure safe, effective and efficient operation on every refuge. These plans contain specific strategies and implementation schedules for achieving refuge goals and objectives. Some plans require annual revisions; others are on a 5-to-10 year revision schedule. Some require additional NEPA analysis, public involvement, and compatibility determinations before they can be implemented. National Wildlife Refuges in BCR 13 are working together on developing their HMPs.

Table 1.2. Step-Down Management Plan Schedule for Missisquoi Refuge.

Step-Down Management Plan	Date Completed/ Updated	Anticipated Date Completion/Update
Habitat Management Plan (HMP)		2006
Visitor Services Plan	1981	2011
Cultural Resources Management Plan		2011
Hunt Plan		To be included in Visitor Services Plan
Trapping Plan	1989	
Wildlife Inventory and Monitoring Plan	1986	
Fire Management Plan	1987	
Law Enforcement Plan	1993	
Safety Program and Operations Plan		1995 draft
Fishery Management Plan		1997 draft
Continuity of Operations Plan		1999 draft
Water Management Plan	1986	To be integrated into HMP
Grassland Management Plan	1986	To be integrated into HMP

Refuge Goals

The purpose of the CCP is to provide the refuge with a 15-year management plan consistent with Service policies and legal mandates that will achieve the following six goals. We developed these goals after considering refuge purposes, Service and Refuge System missions, our vision, and the mandates, plans, and conservation initiatives described above. These goals are intentionally broad, descriptive statements of purpose.

Goal 1 Maintain the ecological integrity of the Missisquoi River delta to ensure a healthy and diverse river and wetland ecosystem providing a full range of natural processes, community types, and native floral and faunal diversity.

Goal 2 Provide diverse upland habitats for Federal trust species including migratory birds and other species of conservation concern in all seasons.

Goal 3 Provide high quality education and interpretative programs to promote an understanding and appreciation for the conservation of fish and wildlife and their habitats, as well as the role of the Refuge in conserving the Missisquoi River delta.

Goal 4 Increase appreciation and stewardship of the Missisquoi River Delta and the Lake Champlain Basin by providing compatible, positive, wildlife-dependent recreation including wildlife observation and photography, hunting, and fishing in accordance with the National Wildlife Refuge System Improvement Act of 1997.

Goal 5 Preserve the cultural and historical resources on the Refuge for current and future generations and to sustain an appreciation of the past.

Goal 6 Foster cooperative partnerships and actions to promote fish and wildlife conservation in the Lake Champlain Basin and Missisquoi River Watershed.

The Comprehensive Conservation Planning Process

The Improvement Act and the NEPA require the Service to seek public involvement in environmental planning and consider all reasonable management alternatives, including a no action alternative, which represents either a continuation of current management practices, or no management at all. Chapter 2 describes the two draft management alternatives for the refuge. Chapter 4 analyzes their potential effects. The planning process for this draft CCP/EA involved three primary steps: (1) initial planning, (2) public scoping, and (3) plan development, described below in more detail.

Initial Planning

We began preparing this draft CCP/EA in 1998. Initially, we focused on collecting information on natural resources and public use. We also developed a vision statement, preliminary refuge goals, and the preliminary issues this plan would address. We compiled a mailing list of organizations and individuals to ensure that we were contacting an array of interested parties.

Public Scoping

We announced the location, dates, and times of three public scoping meetings in Swanton, St. Albans, and Burlington in local newspapers and special mailings in 2000. More than 100 people attended those meetings, which we held to let people know what the Service was doing to manage the Missisquoi Refuge, and to elicit their input on topics of interest to them.

In fall 2000, we distributed copies of our "Issues Workbook" to more than 600 people, to help collect their ideas, concerns, and suggestions on important issues associated with managing the refuge. We distributed the workbook to everyone on our mailing list, those who attended public meetings, and anyone who

subsequently requested one. The workbook asked what they valued most about the refuge, their vision for the future of the Missisquoi River and Missisquoi Bay, the Service role in that future, and any other refuge issues they wanted to raise. We received 60 completed copies of the workbook in return.

In spring 2001, we distributed a "Planning Update" that summarized those responses (see appendix E). The responses from the workbooks and public meetings helped us formulate the issues that relate to resource protection and public use, and helped us develop the draft alternatives. We briefed the regional chief and regional office and refuge staff on the results of the public scoping meetings, and presented similar briefings to the Lake Champlain Ecosystem Team, the Commissioner, Director of Wildlife, and Waterfowl Team Leader of the VT FWD, and the district staff of Senator Patrick Leahy.

Draft CCP Development

In 2002, the refuge staff revised goals, objectives, and strategies based on comments received from the public and our resource management partners. The preparation of chapter 1, "Introduction," chapter 3, "Affected Environment," and the inventory phase of the Wilderness Review began in 2002 and 2003. Staffing changes at the regional office and other refuge priorities necessitated a pause in the planning process.

We restarted the CCP/EA in December 2004. The core planning team consisted of the refuge staff, regional office planning staff, a regional biologist, and one member from the VT FWD. The extended planning team included additional resource professionals from the Lake Champlain Fish and Wildlife Resources Office in Essex Junction, Vermont and program specialists from the Vermont Department of Natural Resources.

Table 1.3. CCP Core Planning Team.

Name	Job Title, Organization
Joe Bertrand	Maintenance Mechanic, USFWS, Missisquoi Refuge
Jennifer Casey	Assistant Regional Refuge Biologist, USFWS, Lake Umbagog NWR
Bill Crenshaw	Wildlife Biologist, VT FWD
David Frisque	Refuge Operations Specialist, USFWS, Missisquoi Refuge
Lindsay Krey**	Assistant Planner, USFWS, Northeast Regional Office
Carl Melberg	Land Acquisition Planner, USFWS, Northeast Regional Office
Eileen Nunez	Visitor Services Specialist, Missisquoi Refuge
Pam Rooney*	Supervisory Engineer, USFWS, Northeast Regional Office
Rick Schauffler	Regional GIS Specialist, USFWS, Great Bay NWR
Ellen Snyder	Wildlife Consultant, Ibis Wildlife Consulting
Lisa Swainbank	Administrative Support Assistant, Missisquoi Refuge
Mark Sweeny	Refuge Manager, USFWS, Missisquoi Refuge
Alison Whitlock**	Wildlife Biologist, USFWS, Northeast Regional Office
Robert A. Zelley	Wildlife Biologist, USFWS, Missisquoi Refuge

**Involved in planning from 1998-1999*
***Involved in planning from 2000-2002*

Table 1.4. Other Contributors to CPP Preparation.

Name	Job Title, Organization
David Capen	Research Professor, University of Vermont (UVM)
John Fellows	Volunteer, USFWS, Northeast Regional Office
Shelley Hight	Archaeologist, USFWS, Northeast Regional Office
Everett Marshall	Biologist/Information Manager, Vermont Nongame & Natural Heritage Program
Lelaina Marin	Assistant Planner, USFWS, Northeast Regional Office
Gloria McCahon	Intern, USFWS, Northeast Regional Office
Zoe Richards	Research Associate, UVM
Eric Sorenson	Natural Community Ecologist, Vermont Nongame and Natural Heritage Program
David Tilton	Project Leader, USFWS Lake Champlain Fish and Wildlife Resources Office
Ian Worley	Professor in Botany, UVM

The core planning team met every 1 to 2 months in 2005 and early 2006 to refine and develop objectives and strategies for each goal of the two alternatives. The issues identified during the public scoping and the analysis of the refuge's physical, biological, and cultural environment provided the foundation for that development.

The habitat objectives and strategies are based on several informative analyses and discussions around key resource issues. To identify the highest priority habitats and associated wildlife species we evaluated BCR 13 species priorities, breeding bird survey trend data, site capability at the refuge, and regional landscape conditions. That led to a thorough discussion on the distribution and amount of early successional habitat to be maintained as grassland or shrub land or allowed to succeed naturally to floodplain forest. See Appendix J for a thorough outline of the information used to determine priority resources of concern for the Refuge.

On June 6, 2005, the CCP planning team met with David Capen and Zoe Richards of UVM to discuss the management of the great blue heron rookery, cormorants, and floodplain forest habitat on Shad and Metcalfe islands. On July 7, 2005, the planning team toured the Maquam Bog with Ian Worley of UVM and Eric Sorenson of the Vermont Natural Heritage Program to discuss the ecology and management of the bog. See summaries of these discussions in appendix G.

Section 7 Review

Section 7 of the ESA requires all federal agencies to consult with the Service to ensure that any actions will not jeopardize the continued existence of any federal-listed species or adversely modify designated critical habitats. The refuge is requesting a section 7 review by our Ecological Services office in Concord, New Hampshire. The refuge has no known federal-listed plants, animals, or critical habitats, so we anticipate no effect on listed species or habitats.

Plan Amendment and Revision

The CCP for Missisquoi Refuge is meant to provide guidance to refuge managers and staff over the next 15 years. However, the CCP is also a dynamic and flexible document and several of these strategies contained in this plan are subject to such things as natural disturbances (e.g., floods, drought) and other uncontrollable events. Likewise, many of the strategies are

dependent upon Service funding for staff and projects. Because of all these factors, the recommendations in the CCP will be reviewed periodically and, if necessary, revised to meet new circumstances. Revisions will be necessary if significant new information becomes available, ecological conditions change, major Refuge expansions occur, or we identify the need to do so during a program review. At a minimum, the CCP will be fully revised every 15 years. We will modify the CCP documents and associated management activities as needed, following the procedures outlined in Service policy and NEPA requirements.

Planning Issues

The core planning team, our state or other partners or the public generated the following issues addressed in the CCP/EA.

Management of the Missisquoi River Delta

The Missisquoi River Delta is the largest wetland complex in the Lake Champlain Basin. Over 50 percent of the waterfowl that use the lake during fall migration (late August through mid-November) are found in this wetland ecosystem. The diversity and uniqueness of its flora and fauna are critical components of the Northern Champlain region. We need to consider protecting such unique natural communities as the Maquam Bog, extensive wild rice beds, and dwindling riparian and floodplain forests. Sedimentation of wetland "potholes" and associated backwaters and sloughs is a concern, and marsh management and restoration should consider waterfowl as well as other wildlife.

USFWS

Agricultural field and recreational path along Rt. 236, adjacent to Missisquoi River up-river from Refuge.

The protection of various wildlife habitats from development and the placement of lands in public trust are important to, and appreciated by, our partners and the general public. Service policy outlines procedures for considering additional lands for protection as part of the National Wildlife Refuge System. In preparing this EA and CCP, we did not request approval from the Director, through the preparation of a Conservation Proposal, to study lands for inclusion into the boundary of the Refuge. This is a necessary step prior to initiating a public process for land acquisition. Interest remains strong in the local area for additional protection efforts. We have outlined a strategy in the Service-preferred alternative that sets the stage for requesting Director Approval to study an expansion of the refuge.

Runoff from residential, agricultural, and industrial sources affects the delta. Because the refuge is located at the mouth of the river, it receives the full impact of any runoff. Pollutants, invasive species, and other concerns in Missisquoi Bay also affect the refuge. We must work to combat these threats to the refuge's ecological integrity while managing its' important wildlife habitats

Non-Native Invasive Species

Nuisance, non-native aquatic invasive plants and animals are one of the biggest problems in the Lake Champlain Basin. Non-native organisms can displace native species, degrade wetlands and other natural communities, and reduce natural diversity and wildlife habitat values. Non-native plants out-compete native species for light, water, and nutrient resources. Invasive species can also limit recreational activities and substantially affect the economy by preventing or restricting access to infested areas by boaters, anglers, or swimmers.

The refuge staff is concerned that, once invasive plants have become established, they are expensive and labor-intensive to eliminate; they are able to establish easily, reproduce prolifically, and disperse readily, making their eradication difficult. Preventing new invasions is extremely important for maintaining biological diversity and native plant populations. Examples of aquatic nuisance species in Lake Champlain include alewife, sea lamprey, zebra mussel, white perch, Eurasian water milfoil, purple loosestrife, phragmites, and water chestnut. Water milfoil and other invasive aquatic plants are of particular concern, because they are displacing natural beds of submerged aquatic vegetation (SAV). SAV beds are critical foraging habitat for the thousands of waterfowl that use the refuge and the bay during migration.

We have not surveyed the refuge for the presence of invasive species in upland habitats, although it appears that few if any are present now. Patches of Japanese knotweed do grow on the refuge. In the last few years, we have applied the herbicide Rodeo™ to control Japanese knotweed.

The two management alternatives in chapter 2 consider different levels of effort to determine the presence of invasive plant species and establish management strategies to prevent or control them.

Water Quality

The degradation of water quality in the Missisquoi Bay and river from sedimentation and nutrient loading is a major concern expressed by many people and organizations in the region. The Lake Champlain Basin Program and the Missisquoi Bay Watershed Plan, among other initiatives, are documenting myriad water quality problems, and are also identifying and implementing solutions. Phosphorus is a nutrient essential for plant growth, but too much phosphorus in water causes algal blooms and excessive aquatic plant growth. Those plants and the water quality problems they cause when they decompose can harm fish and other organisms. Phosphorus levels are elevated in many parts of Lake Champlain, including Missisquoi Bay. Nuisance algal conditions exist nearly half of the time in those areas, and blue-green algae has become extremely problematic in the summer in Missisquoi Bay and other northern parts of the lake.

Other water quality concerns include increased sedimentation caused by upstream land uses that erode stream banks or increase runoff. Much more needs to be done to maintain or restore water quality for fish and wildlife populations in the delta. Because those issues extend well beyond refuge boundaries, any improvements in water quality will require broad partnerships and coalitions.

Upland Habitat Management

Most of the Missisquoi Refuge is wetlands or open water (92 percent). However, 535 acres support upland habitats important for many nesting and migratory songbirds and other wildlife. Thus far, upland management on the refuge has focused on maintaining fields for grassland nesting birds and creating habitat for woodcock. Several of the mowed fields are small and do not now support grassland nesting birds. We will identify the fields that provide quality grassland habitats, and continue to manage them accordingly.

Management of Fish and Wildlife "Trust Resources"

Our federal trust resources include migratory birds, federal-listed endangered and threatened species, inter-jurisdictional fishes, wetlands, and certain marine mammals. Many wildlife species of concern depend on refuge wetlands and are currently a focus of habitat management. Waterfowl species such as black duck, wood duck and mallard, as well as other marsh-dependent species such as American bittern and black tern are a few of the species of conservation concern. Other species such as great blue heron, which occupy a large nesting colony (the largest in Vermont), and an increasing double-crested cormorant population, may require specific species management attention.

Inventory, Monitoring, and Research Needs

The Improvement Act requires us to monitor the status and trends of fish, wildlife, and plants on each refuge. The refuge staff is challenged each year by the staffing, funding, and logistical requirements of an effective resource monitoring and inventory program. The staff must make difficult choices regarding priorities because of limited available resources, which can vary widely from one year to the next. Unfortunately, the refuge budget does not include a dedicated source of permanent funding for carrying out important habitat and population inventory and monitoring. We rely on competitive sources of funding, such as Challenge Grants, Cooperative Agreements, and the National Fish and Wildlife Foundation to supplement Service funding. The uncertain availability of funding from year to year has always hampered long-term planning at the refuge.

For example, partnerships with universities and colleges or other conservation organizations can support Service inventory and monitoring priorities, and we can explore more of those possibilities. UVM, VT FWD, Audubon Vermont, and Lake Champlain Fish and Wildlife Resources Office are important partners in research on the refuge. That research needs to expand to better guide wildlife and habitat management decisions and actions. Monitoring the efficacy of marsh management and wildlife responses was identified as a high priority. More baseline information on migratory birds, reptiles, amphibians, and invertebrate is needed to determine trends for migratory birds and other wildlife.

The two CCP alternatives consider different levels of inventory and monitoring and pursuing partnerships to accomplish priority research projects.

Special Designation Areas

As part of the CCP process we evaluated the potential for special designation areas on refuge lands. Appendix A is the result of our evaluation, including a review of existing and potential research natural areas (RNAs), wilderness, and wild and scenic river designations. The alternatives are similar in that they both recommend maintaining the existing RNAs, and do not recommend wild and scenic rivers designation; however, they differ in their recommendations for wilderness designation.

Balancing Public Uses

The Improvement Act identifies six priority public uses for refuges: hunting, fishing, wildlife observation, wildlife photography, and environmental education, and interpretation. They are to receive enhanced consideration in refuge planning and opportunities for visitors to engage in these activities should be facilitated, to the extent they are compatible with the Refuge System mission and refuge purposes. Service policy (Refuge Manual Chapter 8, 8 RM, 9.1, 4/82) states that, with few exceptions, non-wildlife-dependent recreation will be de-emphasized and should be phased out where it currently exists. Specifically mentioned in the policy as non-wildlife-dependent are swimming, sunbathing, surfing, motorized boating, jogging, and bicycling. Activities are allowed to continue if the refuge manager determines they are compatible with the purpose for which the refuge was established. All recreation activities must be compatible with the purposes for which the refuge was established.

Many public comments we received during the scoping session mentioned public use as the most important issue facing the area. The responses split between people who were concerned about the overuse of the refuge and those who wanted to see more areas opened for public use, particularly hunting and fishing. Some conflicts have emerged between different user groups, in part because of the popularity of the refuge for outdoor recreation.

Quality Refuge Experiences

Missisquoi Refuge is easily accessible from Route 78, a major travel corridor in the region, and via Lake Champlain and the Missisquoi River. The refuge is also close to the Canadian border. Those geographic conditions, combined with the popularity of the refuge for outdoor recreation, present some unique challenges for the refuge staff in maintaining safe, quality experiences for refuge visitors as well as staff.

Some of the public management issues facing the refuge include:

- Illegal dumping
- All-terrain vehicles and snowmobiles, which are not permitted on the refuge
- Vandalism, including graffiti
- Dogs off leash
- Hunting and fishing violations
- Immigration and border issues, such as drug trafficking and alien smuggling

Issues Outside the Scope of this Environmental Assessment

The public or the planning team brought up the following issues during the scoping process. In some instances, the Service does not have regulatory or jurisdictional authority over the issue. Other issues may be covered under other Service programs, initiatives, or planning projects. Chapter 4, "Environmental Consequences," addresses some of the concerns implicit in these issues. However, all of these issues fall outside the stated purpose and need for action in this CCP/EA and, therefore, fall outside its scope of analysis.

West Swanton Bridge

The current construction of a new bridge between West Swanton and Alburg and proposals to remove the existing causeway has generated heated discussions about potential impacts on the Eastern spiny softshell turtle (*Trionyx spiniferus*). Although that species appears on the Vermont Endangered Species list as threatened, it is not federally listed. A significant portion of the spiny softshell population at this end of Lake Champlain over-winters at the site of the new bridge. They also bask on the riprap of the causeways leading to the present bridge. Not only is there a risk of the construction phase of the new bridge disturbing turtles and displacing them from their winter habitat, but also, the proposed removal of all or parts of the old causeway could affect basking activity.

The VT FWD, which has jurisdiction in this matter, has been working with the various agencies and contractors to protect the turtle. Some of the public support the removal of the causeway, assuming that could improve water flow in the Bay and lead to flushing excess phosphorus. Research indicates that removing the causeway would change phosphorus loads by 1 percent or less, while likely harming the spiny softshells.

The refuge is not directly involved in that project, as it is off-refuge and involves a state-listed but not federal-listed species. Some turtles bask and forage on the

refuge during the warmer summer months, but we have not determined whether suitable habitat for either nesting or wintering exists on the refuge.

Dredging the Missisquoi River

Periodically, the idea of dredging the Missisquoi River arises, especially in a year of low water, when recreational boaters have trouble navigating its shoals. During the historically drier months of late July and August and sometimes into October, the water gets so shallow on some shoals that only boats that draft 6 inches or less can pass those areas, most notably on a quarter-mile stretch of river near the old refuge headquarters and at the mouths of the three main branches of the river. Shallow conditions also occur at the mouth of Dead Creek, but dredging it has not been suggested.

Those shoals also block ice flows during the spring thaw, and cause ice dams and occasional flooding upstream near the old refuge headquarters and nearby private residences and camps. Dredging the river would require coordinating a study of the feasibility, environmental impacts, and wetland permit requirements of any dredging proposal, including dredge disposal sites, among at least these agencies:

- the U.S. Army Corps of Engineers, which has primary jurisdiction in such matters;
- the U.S. Coast Guard, which has jurisdiction on this navigable portion of the river;
- the Environmental Protection Agency;
- the U.S. Fish and Wildlife Service; and,
- the Vermont Agency of Natural Resources.

The temporary and seasonal inconvenience to recreational boaters caused by the buildup of sedimentation will probably not justify measures that could have serious environmental impacts or be relatively short-lived, very expensive and of doubtful effectiveness. Dredging the Missisquoi River is neither the desire nor the responsibility of the Service but, if it were seriously proposed, the Service would play a key role in identifying and determining the perceived deleterious environmental impacts of such a proposal on refuge habitats and wildlife.

Swanton Dam

The Swanton Dam, first constructed in 1782, spans the entire width of the Missisquoi River in the Town of Swanton. This dam is off-refuge and outside Service authority. Historically, the dam diverted water to sawmills and gristmills. Discussions have begun to determine the environmental and economic feasibility and level of community support for removing the Swanton Dam to restore the natural flow of the river.

Our recent study concludes that some of the best walleye and sturgeon spawning habitat in Lake Champlain occurs on the Missisquoi River above the Swanton Dam. Spawning substrate for walleye and lake sturgeon is not a limiting factor in this river. However, the quality of the spawning habitats above and below the dam varies considerably with stream flow, water depth, and velocities during the spring spawning period. Although spawning habitat is present below the dam, it is not of sufficient quality to support walleye or sturgeon reproduction. Spawning habitat above the dam provides better habitat capable of expanding the potential reproduction of both species as well as other fish species using the river. Although installing fish ladders and other fish passage devices at the

dam is possible, they generally deliver water at velocities too strong for such weak swimmers as walleye and sturgeon. Reaches of the river above the dam now provide excellent habitat for a large variety of freshwater mussels and species such as the brook lamprey. Alterations to the dam may affect those species of special interest in the State of Vermont.

USFWS

Swanton Dam

Accumulating sediments behind the dam are of particular interest to the refuge. Altering or removing the dam may release sediment carrying nutrients or accumulated harmful chemical elements such as heavy metals, pesticide residue, etc. into the lower reaches of the river, the refuge, and Missisquoi Bay. Should the sediment contain harmful elements, they could affect wildlife populations and habitats. We recommend sampling the sediment behind the dam before any release.